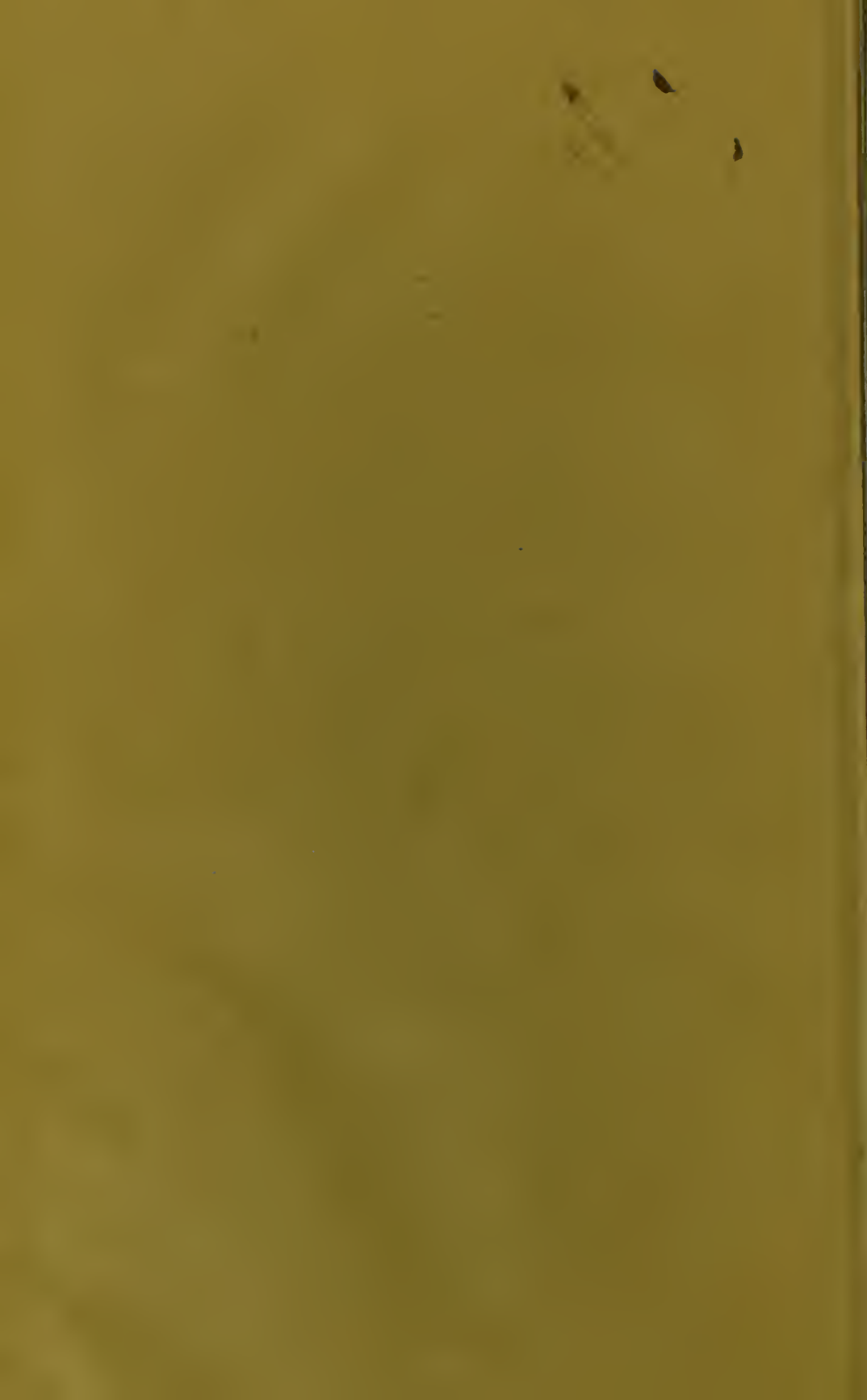


on:

Fielding

Obs: on the Human Struc



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OBSERVATIONS

ON THE

HUMAN STRUCTURE,

BEING THE SUBSTANCE OF

A LECTURE

DELIVERED TO THE

LITERARY AND PHILOSOPHICAL SOCIETY,

AT HULL,

BY GEORGE HUNSLEY FIELDING,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON.  
MEMBER OF THE LITERARY AND PHILOSOPHICAL SOCIETY AT HULL.  
&c. &c.

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Homo sum, humani nihil a me alienum puto.

TERENCE.

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HULL:

PRINTED BY T. TOPPING, 51 LOWGATE.

1828.

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## PREFACE.

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IT is almost unnecessary to state, that the following pages contain but a brief and rapid sketch of the subject proposed. The observations are, principally, of an introductory nature, and their chief aim and end, the removal of certain prejudices prevalent against the prosecution of Anatomical and Physiological Science. With such an object in view, this pamphlet is, with confidence, presented to a discerning yet indulgent public.

ALBION-STREET, }  
HULL, Feb. 29, 1828. }

# NOTES

1888

The following notes are taken from the  
lectures given by the Hon. Mr. Justice  
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## ON THE HUMAN STRUCTURE.

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THE Human Structure presents to our view a most extensive, a most fertile, and a most interesting field for observation and enquiry; and though the tracks may have been well beaten, and the roads often travelled before, still the landscape remains as rich, and the views as beautiful and as diversified as ever; and though *every* traveller may not have it in his power to discover *new* beauties, yet *all* may gild afresh, and give livelier representations of those which have been already drawn by their predecessors, without entering the lists in competition with them;—just as the modern artist who copies the immortal productions of a Raphael, a Michael Angelo, or a Titian, dreams not of rivalling those mighty masters of his art, but rests amply satisfied with the reflected lustre that may gild his humble name from merely following in their steps. There are many vain theorists, of the present day, whose utmost merit scarce can claim this *secondary praise*, and yet, like the frog in the fable, puff themselves up with the imaginary idea of the vastness of their own

importance, till they are unable to bear the slightest opposition, and vent their spleen in petty malevolence and scurrility on all who venture to differ from them. Let such men ponder over, and if possible take example from, the humility and the modesty of that sun of science, the celebrated Sir Isaac Newton, who, when he was complimented on the magnitude and the value of his splendid discoveries, exclaimed “ *I have gathered but a few pebbles on the shores of the vast ocean of Truth.*”

As the scientific Botanist, stationed in the centre of an exquisitely-arranged and a tastefully-disposed garden, where the stately tree and the humble shrub, the brilliant and costly flower, and the modest and unassuming daisy, are found each in its proper place, looks around him through the luxuriant beds and the winding walks, perceives the admirable chain of connection which exists between each class and order, and finds each tree, each flower, and each shrub, to be indispensably necessary to the perfection of the entire garden ; —so it is with the Anatomist when he surveys the human structure ; he sees an infinite and wonderful variety of parts and organs, differing in their arrangement and in their mechanical formation, in their nature and in their uses ; he

also perceives that each bone, each muscle, each artery and each nerve is essentially necessary to the perfection of the entire fabric; but he furthermore discovers, that this bond of union is not merely imaginary, not merely established by the brilliant yet bounded views of science, but depending on a hidden and mysterious agency—a link indissoluble but by death itself—an agency by which the very existence of one part is intimately interwoven with that of another, and by which all are rendered mutually subservient to each other, in even the commonest actions of life. How beautifully is the admirable formation of our structure expressed in the brief, yet comprehensive and powerfully emphatic language of Scripture, “ *We are fearfully and wonderfully made!* ” This is language which must strike home to the breast of every man! This is language so intrinsically self-evident, that none can fail to acknowledge its truth, though few, *very few*, have the least knowledge *how* wonderfully they are made, and those few, whose knowledge is the most extended, will perhaps be the readiest to confess its imperfection. Yet, imperfect as this department of Science confessedly is, as respects final causes, still, as long as human passions and human feelings retain their sway, it cannot fail to be interesting, cannot fail to be instructive,

cannot fail, by unravelling the wondrous mechanism of the creature, to elucidate the wisdom and the bounty of the Creator. “*Quæ contuens*” (says Cicero speaking on this topic) “*Quæ contuens animus, accipit ab his cognitionem Deorum, ex qua oritur pietas: cui conjuncta justitia est, reliquæque virtutes: ex quibus vita beata existit, par et similis Deorum, nulla alia re nisi immortalitate, quæ nihil ad bene vivendum pertinet, cedens cœlestibus.*”

There are times when gaunt disease stalks, like a spectre, through the land, visiting alike the splendid palaces and the gilded canopies of the great and the wealthy, and the lowly cabins and humble couches of the poor and the wretched, levelling alike the peer and the peasant, blighting with his baleful breath the bloom of beauty's cheek, and banishing the balmy slumbers of the infant and the infirm:—these are the times, when the gayest and the gravest, and the strongest and the weakest, are alike taught to feel, how frail, how slight, how uncertain is the tenure of human existence:—and these are the times, when stretched on the bed of sickness and of suffering, when the ordinary occupations, and duties and pleasures of life can no longer be fulfilled, and are no longer profitable; that men are most apt to

turn their eyes, as it were, inwards on themselves, with inquisitive eagerness, to meditate on, and attempt to fathom, the mysteries of the formation of that frame which seems fast departing to join its kindred dust. In the exquisite language of Young,

“ All men think all men mortal, but themselves;  
 Themselves, when some alarming shock of fate  
 Strikes through their hearts the sudden dread;  
 But their hearts wounded, like the wounded air,  
 Soon close; where passed the shaft no trace is to be found.  
 As from the wing, no scar the sky retains;  
 The parted wave no furrow from the keel;  
 So dies in human hearts the thoughts of death.”

True it is, proud science cannot soar with loftier wing than when she aims at the investigation of man himself, the lord of the creation, the source whence she herself derives her being; and yet it is equally as true, that the prosecution of these studies is by numbers deemed highly dangerous, and their discussion most sedulously avoided. The idea that Infidelity and Materialism are necessarily connected with, or consequent upon, the study of Anatomy, and of course attaching to all medical men, is one which has been very widely disseminated and credited, though how or why this should be the case appears totally inexplicable; narrow indeed and bigotted must be the views, and slight and superficial the knowledge of those who make a charge so injurious

and so entirely unfounded: the simple acknowledgement of imperfection in the science, after so many ages of constant and unremitting investigation, appears, *to me at least*, to offer an insurmountable barrier to the proud yet groveling materialist!

“ Here shallow draughts intoxicate the brain,  
But drinking largely sobers us again!”

The deeper we carry our researches, the more wonderful and the more complex are the structures we find, and, like Goldsmith's traveller, as soon as one difficulty is surmounted a fresh one arises in the path.

“ Hills peep o'er hills, and alps on alps arise.”

Who is there that admires not the human eye,—that estimates not its wondrous capability of expression,—and that feels not its power and its fascinating influence when it beams, rich with intelligence, from the soul of beauty? View the same eye gazing, as it were, on vacancy, when the senses are wrapt in oblivion,

We start,—for *soul* is wanting there!

\*                      \*                      \*                      \*

It fires not—weeps not—wins not now!

*Yet that eye is equally as perfect, and equally as structurally beautiful as ever: it is now insensible to the stimulus of the light thrown on it by the*

taper, and you may even discern the image of the taper itself imprinted on that delicate reflecting membrane the Retina; *yet that EYE sees it not*,—and therefore *sight cannot be the simple result of organization*. The same argument will, of course extend itself to all the varied phenomena of life.

An interesting, yet intricate enquiry here very naturally arises; What is sleep?

“Whose reign is o’er seal’d eyelids and soft dreams—  
Sleep like its brother death—so still—so stirless?”—

This is a question much more easily asked than answered. The celebrated metaphysician Dugald Stewart, regards the developement of its nature as beyond the grasp of human intellect, and certainly, so far, the Theories that have been formed on the subject, are any thing but satisfactory. It is here, but as with many other phenomena of our nature, that bounds are placed to our knowledge—we can reach a certain point, but no further. Sleep has been figuratively described as being the image of death, yet, it is in fact, the preserver of life; it is a type of the close of life, and yet the prelude to a new existence; a state of kindly quietude and sweet oblivion, in which, whilst we are powerless and defenceless as the infant, nature is actively employed in visiting the innermost recesses and springs of vital

energy, collecting materials and concentrating her forces for one grand object, the reparation and renovation of the whole fabric.\* However strongly sleep may resemble death in appearance, it is in *appearance, solely*, that the resemblance consists. The vital principle still continues to pervade and to animate the frame, though its mysterious agency is more partially distributed. It is in the senses—the media through which we obtain all our perceptions of external objects—that this deficiency is most apparent; their operation is, in fact, completely suspended, whilst the animal functions of circulation and respiration,†

\* The beautiful soliloquy of Henry the Fourth on sleep, is too well known to need repetition, though it is one of the few things which can never pall. The three lines, which I shall here quote, are truly physiological, and though the imagery may be styled simple and homely, yet it portrays, powerfully and faithfully, the benign influence and peculiar effects of sleep on the animal æconomy.

..... “ O gentle sleep!  
*Nature's soft nurse*, how have I frighted thee,  
 That thou no more wilt *weigh my eyelids down*,  
 And *steep my senses in forgetfulness*.”

† Circulation and Respiration are both carried on with rather less energy and rapidity during sleep, and it is fair to suppose, that this comparatively sluggish state of the circulation may in part account for the phenomena of sleep, from the diminished quantity of stimulus which is thrown into the brain. Blumenbach regards this circumstance as the actual cause of sleep, whilst others have gone into the opposite extreme, and supposed that it is caused by engorgement of the vessels of the brain, and consequent mechanical pressure on the sensorium, and in fact making it resemble

of digestion and absorption, of assimilation and secretion are still actively carried on, the three last with even greater vigour than when awake. This hypothesis is certainly supported by observing the comparative duration of sleep at the different periods of life. In early childhood, when the most rapid evolution of the organs and the most active growth of the limbs is required, sleep occupies the greater part of the day; as we advance in years, less rest is required, and when arrived at maturity, about one-fourth or from that to one-third of the twenty-four hours is sufficient, and in old age the sleep is seldom sound or of long duration, and apt to be influenced by the slightest causes. To return from

apoplexy. In proof of the latter theory, the case of the Parisian beggar was cited, who had a perforation in his skull, through which the brain might be compressed. On the application of a finger to the part, and gentle pressure being made, the man fell into a kind of apoplectic sleep. It is needless to multiply theories on this subject, we know nothing of the actual nature of sleep, although it is pleasing to investigate and unravel the various phenomena which it manifests. Dreams and somnambulism, are amongst the most extraordinary of these phenomena—of the latter state, many wonderful cases are on record, and it is a state of extreme peril, from the absence of the senses to guide the sleepwalkers during the many and strange situations they are impelled to seek. The lovers of the marvellous have strange ideas of the dexterity of these somnambulists in avoiding danger, but when it is remembered that they are acting entirely from the remembrance of former impressions, and without the use of their senses, this opinion will at once be seen to be erroneous, and like many other marvels entirely without foundation.

this digression :—what proofs shall we find that the study of Anatomy instils these sentiments of Infidelity which have been so *liberally* attributed to it? none, or next to none :—on the contrary we shall perceive that the exquisite mechanism of the human fabric has always been regarded as one of the strongest proofs of the necessity of a Supreme Being. To take a splendid instance from the earliest times, when Anatomy was but in its infancy :

It is related of the celebrated heathen, Galen, that walking one day in a shady grove, far removed from the noise and the bustle of the world, he accidentally found, in a retired spot, a *Human Skeleton*. It is highly probable that he had wandered out to that retired place, for the purpose of solitary meditation, and, in the remnant of mortality that was thus by chance presented to his view, he found sufficient to impress his mind most deeply, not merely as a Philosopher, but as a man.

When he surveyed this only remaining memorial of some being who had once been as fully in the possession of every attribute of human nature as he himself at that moment was,—when he saw the total ravages that death and time had made upon the softer and more beautiful, yet

frailer and more perishable parts of the frame,—when he looked on the dry bony structure and saw the beautiful mechanical arrangement of its constituent parts, and their exact relative proportion to each other, the aptitude of even the minutest portion for the actions it was destined to perform, and the lightness, and elegance, and yet evident firmness and strength of the entire structure;—when he had contemplated *all this*, he very naturally arrived at the conclusion, *that such mechanism could not have been constructed by chance*; and that the Architect who had the wisdom to plan and the ability to execute such a structure *must have been* DIVINE!—in a word, he became convinced of the existence of a God. Let us trace this subject a little further, let us suppose, that instead of the mouldering skeleton, he had found the same being, a few hours after the close of his existence, stretched along the turf in solitary nakedness; let us picture to ourselves the body stamped with the pallid hue of death, each limb still possessed of its roundness and its symmetry, though deprived of its elasticity and its strength, the fixed unchanging rigidity of the features,—the cold, passionless eye sunk motionless in its marble socket, but still the whole conveying to the beholder the idea of calm and unperturbed repose;—would not this

have struck him more forcibly ?

“ Yes—but for these, and these alone,  
Some moments—aye—one treacherous hour,  
We still might doubt the tyrant’s power,  
So fair—so calm—so softly seal’d  
The first—last look—by death reveal’d.”

But still further—let us animate this exquisite piece of mechanism, let us supply the Promethean fire—the living principle—let us give vitality and capability of exertion to the limbs, to the arms their strength, and to the legs their swiftness ; let the heart beat and the blood freely circulate, let the face resume its expression, the brow its grandeur, the voice its melody and the eye its fire, and (I will be judged by any one) is not the divinity of its origin stamped a thousand fold more strongly ?

In modern days, the celebrated and valuable work of Archdeacon Paley on Natural Theology, in which he treats at great length on the human structure, and deduces from it his most powerful arguments of the existence of a Deity, is universally known and as universally admired, and presents in itself a host against these illiberal objections. I trust it is unnecessary to pursue this topic any further. There is however another point, (and an unfortunate one it is for the study of Anatomy,) which must not be omitted, and

which certainly seems somewhat surprising when we consider the general diffusion of knowledge (or in the cant phrase “the march of intellect”) throughout the country ;—I allude to the opposition, which is almost every where made, to the examination of the dead, and the unrelenting severity with which exhumation is still punished.\* It would be perfectly superfluous to say a single word on the absolute and imperative necessity of Anatomical Knowledge, because it is now universally known to be the basis of Surgical and Medical Science. There are confessedly—let me repeat it—there are confessedly, even in the present advanced state of knowledge, many things, relative to the uses of certain parts of the human body, still hidden from us; and there are painful and lingering diseases, which still baffle the efforts of the most skilful, and are, in fact, believed

\* The unfortunate case which occurred, a short time since, at E——, (in consequence of which the medical gentleman implicated was imprisoned and heavily fined,) is, no doubt, still fresh in the memories of most persons. The custom of feeding the public appetite for horrors, with long, and frequently exaggerated accounts, of these painful occurrences is sadly too much the fashion, and cannot be too much deprecated. Far from blazoning these transactions abroad, it would seem much more natural to conceal them, as much as possible, from the public eye, although there are many persons, no doubt, who take pleasure in reading them, just as they do in perusing an account of a horrible murder, a dreadful shipwreck, the overturning of a coach, or the bursting of a steam engine.

to be *incurable*: is it not then fair to suppose, that if we could, by continued investigation, arrive at a more enlarged and a more accurate judgment of the formation of the human fabric, that the knowledge thus derived might enable us to contend with these desperate and deadly disorders? The invasion of the sanctuaries of the dead (however imperatively necessary it may be) appears so revolting and so harrowing to the feelings of the majority of mankind, that it is “a consummation most devoutly to be wished,” that the legislature could make some efficient provision for the furtherance of science, by which, if possible, this painful alternative might be avoided.

At the head of the creation, man stands proudly pre-eminent. The intellectual capacities, with which he has been so beneficently endowed, exalt him immeasurably above, and distinguish him most indisputably from all other animals, notwithstanding the very close resemblance of some of the Anthropomorphous tribe.\* His reason

\* So close is this resemblance in the Oran Otan, that many Philosophers have actually supposed this Ape to be a variety of the human species. Linnæus describes him as “Homo Nocturnus, Troglodytes, vel Sylvestris. Corpus album, incessu erectum, &c. &c. Loquitur sibilo, cogitat, ratiocinatur, credit sui causa factam tellurem, se aliquando iterum fore imperantem.”

has taught him how to subdue, and render serviceable, many of the strongest and most formidable animals, and to domesticate others: it has taught him to dive into the mysteries of nature and bring forth her hidden stores and treasures: it has taught him, to rival the bird in ranging the trackless æther; to emulate the fish, in traversing the pathless and the boundless ocean, and to render even the elements themselves subservient to his will. Who, but a few

Bontius says "*Nihil humani ei deesse diceres præter loquelam.*"

Lord Monboddo, in his *Ancient Metaphysics*, observes; "I have brought myself to a perfect conviction that the Orang Otang is a human creature as much as any of us." Again, "I think I have established his humanity, by proofs that ought to satisfy every one that gives credit to human testimony."

The accurate Buffon also gives the following singular observations, after quoting the anatomical examination of the structure of this animal by Cowper and Tyson. "*Si l'on ne faisoit attention qu'à la figure, on pourroit également regarder l'Orang-outang, comme le premier des singes, ou le dernier des hommes, parcequ'à l'exception de l'ame, il ne lui manque rien de tout ce que nous avons, et parcequ'il differe moins de l'homme pour le corps, qu'il ne differe des autres animaux, auxquels on a donné le même nom de singe.*"

L'ame, la pensée, la parole ne dependent donc pas de la forme ou de l'organisation du corps; rien ne prouve mieux, que c'est un don particulier et fait a l'homme seul, puisque l'Orang-outang, qui ne parle ni pense, a neanmoins le cerveau et la langue entièrement semblables à l'homme.

Le cerveau est absolument de la même forme et de la même proportion, que dans l'homme, et il ne pense pas."

Buffon *Histoire Naturelle.*

short years back, would have believed that ships and carriages would ever have been propelled by vapour? or that oil or coal could have been made to yield the brilliant gaseous light with which this room is now illuminated? Yet these are but *specimens* of the many and wonderful, and yet common and daily proofs of his restless ingenuity and invention. It is not however in his *intellect only* (as many philosophers would have us believe) that man is so superior to the rest of the animal creation; he is also pre-eminently superior in his physical formation—that is, in the admirable adaptation of his structure for the fulfilment of all the various purposes which his reason dictates. No one can pretend to deny that numberless animals are possessed of certain attributes and qualities in a far greater state of perfection and power than man: thus the mighty Elephant, the fierce yet noble Lion, or the huge Leviathan, have infinitely greater bodily force and strength: the Deer, the Horse, or the Greyhound, possesses far superior swiftness of foot: the soaring bird of Jove, or the bright-eyed Hawk, has far greater capabilities for velocity of motion, and a far more piercing and powerful vision: the Pointer Dog excels man beyond comparison in acuteness of smell; and the Canary Bird not only surpasses him in natural melody,

but also exceeds him in his boasted proportional quantity of brain. Numberless other instances might easily be adduced in support of this point, but the next thing to be considered, is, upon which of these animals reason could have been *more fitly* bestowed than upon man? or, in other words, which structure is better adapted for the exercise of its dominion? Let us imagine any one of these animals to have been gifted, instead of man, with his intellectual powers, and to have all his varied actions and objects in life to pursue and to fulfil; suppose an Elephant attempting to make a watch, or a Horse to write a letter, and the utter inefficiency must strike every one. No! the frame of man, and of man alone, was formed and calculated for the dominion and exercise of reason! Look at the human being, during the period of infancy; he is at once the most helpless and the most dependant creature in the animal kingdom. There is no other animal so long in arriving at the maturity of his powers,—nay, even in attaining the period when he is capable of providing for his own immediate necessities. Look at the naturally erect position of the body—that noble attribute, which, notwithstanding the strange theories of Daubenton and Barthez, is now ascertained to be the peculiar characteristic of man.

“Prona que cum spectent animalia cetera terram  
Os homini sublime dedit; cœlum que tueri  
Jussit; et erectos tollere ad sidera vultus.”

Look at the admirable configuration of the head and face,\* and consider the wondrous capability of expression with which the latter is endowed:—reflect on the exquisite perfection of the organs for the modulation of sound and the purposes of speech:—consider the peculiarities of the mechanism of the feet, and more particularly still, the form and beauty of the hand, which as Helvetius has observed “was made for the head” and then let us ask ourselves, are not these sufficiently powerfully striking proofs of the physical superiority of man, as regards his capacity for the dominion and display of the divine gift of reason?† Nor need man envy the mighty bodily power of the Elephant, or the

\* This difference did not entirely escape Buffon in the zeal of his investigations about the Oran Otan, for he says “L’Orang Oûtang differe de l’homme à l’exterieur par le nez, par le front qui est trop court, par le menton qui n’est pas relevé à la base, il a des oreilles proportionnellement trop grandes, les yeux trop voisin l’un de l’autre, l’intervalle entre le nez et la bouche est aussi trop étendu, &c.”

Histoire Naturelle.

† “Sed nostra omnis vis in animo & corpore sita est. Animi imperio, corporis servitio magis utimur. Alterum nobis cum Diis, alterum cum belluis commune est. Quo mihi rectius videtur, ingenii, quàm virium opibus gloriam quærere; et quoniam vita ipsa, qua fruimur, brevis est, memoriam nostri quàm maxumè longam efficere.”

Sallust.

lofty flight and piercing vision of the eagle: his reason teaches him how to subdue the untamed force and fury of the former, and to compel him to exert his prodigious strength in servitude; to be like the latter, his whole economy must be changed, while as he is, his active mind can carry him to far sublimer regions, and to far loftier heights.

It has been the fashion of late, to ascribe all this measureless superiority of man over the rest of the animal creation, to the greater proportional quantity of his brain in comparison with the weight of his body.\* Soemmerring, however, has proved, by direct experiment, that this *new theory*, of proportions (only known ever since the days of Aristotle†) is incorrect in many

\* Extract from Soemmerring's observations on the comparative weight of the brain, with relation to the weight of the body, in various animals.

Man.....	$\frac{1}{27\frac{1}{2}}$
Several tribes of Simice .....	$\frac{1}{22}$
Sparrow.....	$\frac{1}{25}$
Canary Bird .....	$\frac{1}{14}$
Dog.....	$\frac{1}{101}$
Goose.....	$\frac{1}{360}$
Elephant.....	$\frac{1}{300}$
Turtle.....	$\frac{1}{3688}$

† Ab *antiquissimis ipsius ARISTOTELIS temporibus*, prævaluerat quidem opinio, hominem maximo gaudere encephalo, totius corporis respectu habito, adeo ut pondus et volumen cerebri cum pondere et volumine reliqui corporis comparatum, in nullo animalium tam magnum reperiretur. Quum

instances. The hypothesis, therefore, which was formed on the supposed correctness of this theory, (and which is also anticipated by Soemmerring,) must likewise fall to the ground.

Let us next take a brief survey of the different parts and organs which constitute the Human Structure.

As the basis and groundwork of the frame, we have the Bones; these are firm and unyielding in their texture, give support to the softer parts, furnish a fixed medium of attachment for the muscles and ligaments, and afford a valuable defence to the more delicate and vitally important organs. But firm and unyielding as the bones are, still from their exquisite arrangement and from the number and perfection of the joints, and other admirable contrivances by which they are connected together, the motions which man is capable of performing are collectively more free, more extensive, and more numerous than those of any other animal. The human skeleton consists of no less than 249 Bones, a number which cannot but strike us as amazing, though

*vero recentiores anatomici exactius eam proportionem per varia animantium genera examinarent, multa profecto inveniebant animalia, imprimis inter simias minores, mures et aves, quæ pondere encephali, comparato cum reliqui corporis pondere, hominem superarent."*

Soemmerring de bas. Enceph.

at the same time it powerfully supports what has just been advanced.

Where the bones are connected together to form joints, their opposing surfaces are coated with cartilage as smooth, as polished and as bright as the finest glass, and lubricated with an oily fluid, which is secreted there for the purpose; and thus the fatal effects of friction are obviated, and, to take an example, the knee joint, which, by the lowest computation, is used eight millions of times in a year, is at the expiration of that time as perfect as ever. The joints are duly confined, protected and strengthened by numerous ligaments, which prevent their exceeding the proper limits of their motion, and thus guard against dislocations.

To set these joints in play, and at the same time govern and direct their motion, is the office of the muscles. At their insertions near the joints the muscles terminate in tendons, by which means a condensation of power is obtained, and the beauty of the figure is consulted. This last object is still further enhanced by the cellular membrane, which fills up all the interstices between the muscles, and rounds off the limbs. Over all is extended the highly elastic membrane of the skin.

This then concludes the description of the parts which serve for the purposes of locomotion, but we have yet to enumerate other, if not more important, yet more vitally necessary, organs which lie concealed in the various cavities of the body.

In the large and spacious hollow of the chest, confined and protected by the bony compages of the ribs, we have that indispensable part of the animal economy, the Lungs, *by which* respiration is carried on, and *in which* the blood undergoes that peculiar process termed Oxydation, and is changed from a deep purple, to a bright scarlet colour. Here also we find the wonderful centre of the circulating system, the **HEART**, that living fountain which impels the healthful tide of life, through its mighty rivers and their innumerable branches, to every individual part of the microcosm, there to bestow its finer particles for the repair of all the various structures; the grosser portion is taken up by other communicating streams with their corresponding ramifications, is mingled with the chyle or new blood, poured in by the tributary branches from the absorbent system and returned in one vast purple current to the goal whence it set out; thence it is impelled through the lungs for the purpose of purification,

returned again to the heart, changed to a bright scarlet hue, and again distributed through the body. There is perhaps nothing more truly surprising than the fact, that all the different parts and secretions of the body, the bones and muscles, the bile, the gastric juice, the saliva, the tears, &c. &c., are formed from one and the same fluid, the blood. How this wonderful process of transformation is effected, it is impossible to say; each secretion is formed in its own peculiar laboratory, and all have their separate and distinct properties and uses.

The human machine is, by necessity, subjected to perpetual decay, and of course, continual reproduction is requisite to repair and preserve the perfect state of the structure. We have seen that this renovation is effected by the plenteous distribution of blood but we have next to consider how the supply of blood is kept up. For this purpose, we shall find ample provision in the organs contained in the capacious cavity of the abdomen: here are seen the Stomach, the large and small Intestines, the Liver, the Pancreas, &c. &c., forming a complicated apparatus in which, and by the secretions of which, the food which we eat is digested and assimilated, and finally separated into two parts, chyle, which is

in fact colourless blood, and refuse which is passed away through the bowels.

And now a fresh system of vessels is required to take up and convey the chyle into the circulating mass of blood, and to carry away the decayed or useless particles of the frame, this is the office of the Absorbents. These vessels form a complete network in every part of the body, and, while they perform these indispensable duties, they at the same time afford one of the most fertile sources for the admission of disease, and the deleterious action of various poisons and noxious vapours; it is through their means that the livid plague and the wasting fever, the saliva of the rabid dog, or the scarcely less formidable poison of the Ticunas, obtain their fatal influence over the frame, but, let us not forget that, it is also by their means that we are principally enabled to introduce medicinal remedies into the system, and to combat disease and decay, in all their various forms.—Still lower down in the body, in what is termed the Pelvis, we find the Urinary bladder and those organs which are appropriated to the propagation and preservation of the species.

Lastly, man requires some power to guide and direct him in his communications with his fellow-creatures, with himself, and with the rest of the

world, animate and inanimate, and some apparatus by which he may receive cognizance of whatever is beneficial and hurtful to him. All this is amply provided for by the copious distribution of nerves throughout the whole body, and by the exquisite structures furnished for the purposes of seeing, of hearing, of smelling, of tasting, and of feeling.

The brain, the mysterious centre of all this nervous energy, where every sensation is received, and as it were registered, is situated at the top of the spinal column, and contained in and protected by a hard bony case, the skull. The brain moreover contains, according to the fancies of some, the seat of that invisible and intangible essence the soul,—Des Cartes squeezed her into the pineal gland, whilst others, more generously, granted her the whole range of the skull,—and here they suppose she sits enthroned and holds her court, from hence issues her mandates, and dispenses her vivifying agency throughout the whole body. It is, certainly, somewhat extraordinary that this anxiety of fixing on a local habitation for the soul should have prevailed ever since the days of Aristotle. We have had advocates for many different parts of the body for this purpose, as the heart, the brain, the stomach, the

pineal gland and the liver. All, however different in their ideas of locality, are agreed on one point, that no *traces* of the soul have ever been seen, and therefore justify us in the conclusion, that it is an essence, “which no man hath seen, nor can see, nor can it enter into the heart of man to conceive;”—and most are ready to acknowledge the immortality of its nature and exclaim, in the beautiful words of Addison,

“The stars shall fade away, the sun himself  
Grow dim with age, and Nature sink in years;  
But thou shalt flourish in immortal youth,  
Unhurt amidst the war of elements,  
The wreck of matter and the crush of worlds.”

THE END.